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ABSTRACT

This study tests the hypothesis that components of play such as immagination contribute tc cognitive development. Twenty-four middle-class children attending a university-affiliated preschool were observed for 20 one-minute play observations during the Spring Semesters of 1978 and 1979. Play was coded using categories for both social (solitary, onlooker, parallel, and interactive) and cognitive (functional, constructive, and imaginative) components. Imaginative play was further scored for number and type of transformations (person, object, situations) and for thematic content (sociodramatic or fantasy). During each semester, children were administered the Peabody Picture Vocabulary Test (Form B) and the Ravens Progressive Matrices tests of intelligence, and a battery of classification (dichotomous sort, cross-classification, and class inclusion) and conservation (liquid substance, number, length, area, and weight) tasks. Pairing of play and cognitive test change scores from year one to year two revealed that, generally more children increased in cognitive ability without increasing in imaginative play than did those who increased in dramatic play without increasing in cognitive ability. Results suggest that directional influence between these two variables moves from cognitive ability to imaginative play and not vice versa. (Author/RH)

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DEVELOPMENTAL CHANGES IN IMAGINATIVE PLAY AND COGNITIVE ABILITY OF PRESCHOOLERS

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Abstract

Twenty-four middle-class children attending a university-affiliated preschool were observed for 20 one-minute play observations during the Spring Semesters of 1978 and 1979. Play was coded using categories for both social (solitary, onlooker, parallel, and interactive) and cognitive (functional, constructive, and imaginative) components. Imaginative play was further scored for number and type of transformations (person, object, situations) and for thermatic content (sociodramatic or fantasy). During each semester, children were administered the Peabody Picture Vocabulary Test (Form B) and the Ravens Progressive Matrices tests of intelligence, and a battery of classification (dichotomous sort, cross-classification, and class inclusion) and conservation (liquid substance, number, length, area, and weight) tasks. Pairing of play and cognitive test change scores from year one to year two, it was found that disporportionately fewer children increased in imaginative play without a concommitant increase in cognitive ability than children increasing in imaginative play without also rising in cognitive ability. This general pattern was more discernible for more specific than for more general indices of imaginative play. The results suggest that cognitive ability may perhaps better be described as an antecedent condition for imaginative play than play as a contributing factor in cognitive development.

Developmental Changes in Imaginative Play
and Cognitive Ability of Preschoolers

The title of this symposium, "Play: A causal agent in child development?", may seem to some people to be raising a very easy question to answer. Strictly defined, causality implies generativeness and exclusiveness (Bunge, 1959). Certainly playing does not "produce" development in this sense, just like television watching or laughing does not "cause" development. On the other hand, alternatives to a strict causal relationship between play and development include reciprocal determination, self-determination, random interplay, spuriousness, etc.. A common belief is that there is an interaction between play and development in general, and between imaginative play and cognitive development in particular. Theorereticallу, both may be related to a third factor, the child's emerging symbolic capacities (Piaget, 1962; Singer, 1973), or representational competence (Sigel, 1970). Reference to this third factor, which can be said to be a product of both maturation and experience, can account for the sundry linkages between play and cognition that have been suggested by the literature, a body of research reporting associations of imaginative play with social cognition (e.g., Saltz & Johnson, 1974) and divergent thought (e.g., Dansky, 1980), as well as with measures of classification (e.g. Rubin & Maioni, 1975), conservation (e.g., Golomb & Cornelius, 1977), and intelligence (e.g., Johnson, 1976). Emergent cognitive structures in general and decentration ability in particular may be the "glue" which binds together

these findings concerning these various aspects of the child's symbolic system. All the aforementioned cognitive abilities can be described as entailing decentration, or the ability to shift in deploying one's attention. The same can be argued for imaginative play which entails the framing and reframing of experience, or what has been described as a dialectical relationship between the play script(content) and playframe (context) (Schwartzmann, 1978). The playframe-break and boundry-crossing between the literal and the nonliteral can be defined to be as much a part of the play experience as the pretense itself. This position, that it would be artificial to isolate play content from context, is not too different from the point argued by Weisler and McCall (1976) concerning exploration and play. Whereas a distinction may be valid for infants and simpler organisms in whom the discontinuity may be more pronounced, it becomes exceedingly difficult to categorize play into components and still do justice to the flow of play behavior of preschoolers, school-aged children, and adults. Once again we are reminded of the difficulty in defining play.

Opposition to the view that imaginative play and cognitive development are two sides of the same coin comes from experimental psychology in its search for antecedent-consequent relationships. While random interplay may be the null hypothesis in correlative research, repicrocity can be viewed as the null hypothesis in the search for directionality. Two alternative hypotheses in directionality research also exist. One is that a certain level of cognitive maturity is a prerequiste for certain forms of play. As a simple example, most would not argue that young infants could engage in make-believe play. According to this view, it would be expected that cognitive ability components could be identified as precursors to expressions of certain kinds of play behavior. On the other hand, the second

bolder, hypothesis is that certain play components contribute to cognitive development. According to this second hypothesis, it would be expected that imaginative play could be identified as a precursor to expressions of certain kinds of cognitive ability. Influenced by the play training studies, we expected some support for the second hypothesis, but only when setting aside our basic assumption that there is reciprocal interaction between cognitive ability and imaginative play.

Method

Sample

Children participating in this research came from middle class families representing diverse racial and ethnic groups who were enrolled in one of two classrooms of an University-affiliated preschool center on the Madison campus. An original group of 35 children began the first year. Of these, nine children did not return the second year. Attrition was primarily due to a child's family moving away. Two of the remaining 26 children refused testing leaving a final total sample of 24 children (13 girls and 11 boys with a mean age of 43 months) on which complete data were obtained. It should be noted that biases related to selective participation were absent from the present results pertaining to cognitive tests performance. With respect to play behavior, children who left were significantly more social in their play than those children who remained in preschool for the second year. Furthermore, analyses of variance for the initial assessment year indicated a significant main effect of classroom and child gender for some play measures. It should be noted that the present analyses report data for the combined grades and sexes.

Play Behavior

The data reported in this study were collected in the Spring semester of 1978 and 1979. Each semester the children were observed for 20 one-minute play episodes. Each episode was coded in terms of both the play type (unfocused, functional, constructive, and dramatic) and the degree of social interaction (solitary, onlooker, parallel, and interactive), following Smilansky (1968) and Parten (1932). In addition, particular attention was given to dramatic or imaginative play. Imaginative play was coded as either dramatic or socio-dramatic (interactive), possessing imitative (based on a direct real life experience such as a visit to a doctor's office) or fantasy (based on an indirect experience such as enacting Star Wars) thematic content, and for the number and type of transformations (self, other, object-replica, substitute, or pretend object use, and situations-with or without props). Intercoder agreement ranged from .69 to 1.00 on the various play measures based on mutual scoring by independent judges of 15% of the data.

Cognitive Assessment

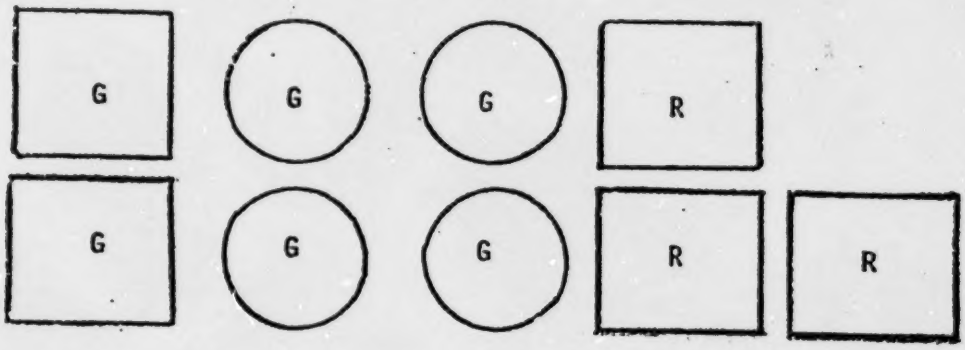
In addition to the Peabody Picture Vocabulary Test (Form B) and the Raven Progressive Matrices Test (two standardized intelligence tests which were administered in the usual ways), the cognitive tasks administered are described below. Identical cognitive tests batteries were administered during each time of measurement, Spring 1978 and Spring 1979.

1. Dichotomous Sorting. Materials: 2 small blue squares, 2 large blue squares, 2 small blue circles, 2 large blue circles, 2 small red squares, 2 large red squares, 2 small red circles, 2 large red circles.

Procedure and Scoring. The blocks were placed before S in a scrambled fashion so that the different classes were scattered throughout the arrangement. E made inquiries about the blocks until S had verbalized all relevant distinguishing attributes. If S did not do this, E verbalized relevant attributes. This done, E instructed S to divide all the blocks into two bunches by placing all the

blocks that were the same in each box. When S had finished, S was asked to explain the way he divided the blocks. For the second and third dichotomies, this procedure was repeated. Each time E asked S to divide the blocks in a different way than he had done before. Each correct sort (i.e., dichotomous and exhaustive according to different criteria) was given a score of 1, with 1 point for each correct justification. Thus, the range for this task was 0-6.

2. Class Inclusion. Materials: 2 green squares, 4 green circles, 3 red squares, arranged on table facing S:



Procedure and Scoring. The blocks were placed in front of the S, and E made inquiries about the blocks until S had verbalized all relevant attributes. If S did not do this, E verbalized the relevant attributes. E then presented S with 6 trials presented in fixed order. Trial 1 consisted of the question, "Are there more green blocks or green circles?". Trial 2 consisted of, "Are there more blocks or more red squares?". Trial 3 was, "Are there more green blocks or more blocks?". The fourth, fifth, and sixth trials consisted of the same three questions with the categories in reverse position in the question. Each question was scored 0 or 1 for incorrect or correct, with a range of 0-6.

3. Cross Classification. Materials: 3 x 3 matrix board, 9 pictures of children: 3 with orange pants - 1 sitting, 1 standing, 1 running; 3 with green pants - 1 sitting, 1 standing, 1 running; 3 with purple pants - 1 sitting, 1 standing, 1 running.

Procedure and Scoring. The picture cards were presented to S in a random array. E made inquiries about the pictures until S had verbalized all relevant attributes. If S did not do this, E verbalized relevant attributes. S was then asked to put each picture on the matrix board so they belonged together. The range of scores was 0-7, with 0=totally incorrect, 1=one row or column correctly sorted (e.g., all children standing), 2=2 rows or 2 columns correctly but independently sorted, 3=3 rows or 3 columns correctly but independently sorted, 4=1 row and 1 column intersecting, 5=2 x 2 matrix, 6= 2 x 3 matrix, and 7=3 x 3 matrix.

4. Conservation. Materials: 5 conservation tasks were presented. Task 1 (liquid substance): 1 beaker, 100 ml., 2 beakers, 400 ml., 100 ml. colored water. Task 2 (number): 12 pennies. Task 3 (length): 2 pieces of string, each 28 cm. long, 2 toy cars, 1 piece of felt, 30 cm. x 30 cm.

Task 4 (area): 2 green boards, each 30 cm. x 30 cm., 2 toy cows, 6 toy barns (transformation 1), 14 toy barns (transformation 2).
Task 5 (weight): 2 balls of playdough, equal size and weight.

Procedure and Scoring. For each task, E presented two indentical materials to S, establishing their quantitative equality. Following this, E transformed one of the materials and asked the following 3 questions.: (1) Is A the same _____ (e.g., length) as B?, (2) Is A more _____ (e.g., length) than B?, (3) Is B more _____ than A?. A justification for S's correct judgment was asked. For each conservation task a score of 1 was given for a correct judgment and a score of 1 for correct justification. For each conservation task, the range was thus 0-2 for the judgment and justification. The total conservation range of scores for all five task was 0-5 for judgment and 0-5 for justifications, with a 0-10 range for total conservation.

Results

Analysis. In this study four cognitive ability measures and five play measures are used in the analysis. The cognitive measures examined are IQ scores on the Peabody Picture Vocabulary Tests (PPVT) and on the Raven Progressive Matrices Test, and the score on the classification test battery (the dichotomous sort, cross-classification, and class inclusion) as well as the total score (judgment plus explanation) on the conservation battery (mass, number, area, weight, length). The play behavior reported are total scores on the measures for total dramatic play, sociodramatic play, transformations, situational transformations without props, and frequency of fantasy theme enactment. In the analysis described below, while the summed total of conservation score performance was used in determining direction of change, the child had to increase on all three classification tasks to be classified as showing a positive change on the total classification measure.

For each cognitive and play measure the change score from year one to year two was computed and was categorized for each child as showing or as not showing a positive change. Analyses were done pairing each cognitive measure with each play measure. A determination was made of the frequency of children who exhibited an increase on both the play and the cognition measure, an increase on the play measure but not on the cognition measure, an increase on the cognition

measure but not on the play measure, and no positive change on either the play measure or the cognition measure. For each pair of cognitive and play measures, McNemar Exact Sign Tests were used in comparing the proportion of children falling in the two change cells; i.e., children displaying a rise in imaginative play behavior without an increase in cognitive ability versus children exhibiting an increase in cognitive ability without demonstrating an increase in imaginative play. Although not a test of a causal relationship, this analysis was done to yield results suggestive of a possible directional influence between the play measures and the cognition measures. If disproportionately more children were increasing in cognition without increasing in play, compared with the number of children increasing in play without increasing in cognition, then the result would seem to suggest that cognition is an antecedent for play, while the converse would seem to suggest that play is an antecedent for cognition.

Findings

Table 1 presents the data showing the pattern of change in cognitive test performance and imaginative play behavior from year one to year two for the 24 preschool children in the present study. Three findings are noteworthy.

First, in most cognitive-play measure comparisons, a greater number of children either increased or did not increase on both measures compared to the number of children who showed an increment on one measure but not the other, suggesting a relationship between imaginative play and cognitive ability. Second, examination of the change cells shows that for those children who did change on primarily one measure generally more children increased in cognitive ability without increasing in imaginative play than the number of children increasing in dramatic play without in-

creasing in cognitive ability. Third, this change score pattern was more pronounced for more specific imaginative play measures. Specifically, the pattern was more discernible for situational transformations without props and thematic-fantasy themes than for socio-dramatic play. In turn, the change pattern for sociodramatic play and cognitive ability was clearer than the change pattern involving dramatic play and transformational behavior in general. Two McNemar tests were significant. For 13 observations in the change cells, the one-tailed critical value is 10. This result was obtained for the conservation ability-fantasy play and the conservation ability-situational transformation pairs. Significantly more children (N=11) increased in conservation ability without increasing in these two measures of imaginative play than the number of children (N=2) who increased in these forms of imaginative play while not increasing in conservation ability.

Discussion

Our results suggest an association between imaginative play and cognitive ability. Moreover, the results would seem to suggest that any directional influence that might exist between cognitive ability and imaginative play goes from cognitive ability to imaginative play and not from imaginative play to cognitive ability. With the data analyzed to discern suggested direction and not to test a causal relationship, the change score patterns between cognitive and play behavior from year one to year two indicated that disproportionately fewer children revealed increments in imaginative play scores without concomitant increases in cognitive ability than the number of children showing a rise in imaginative play skills without also rising in cognitive ability. In other words, the results suggest that cognitive ability may perhaps better be described as an antecent condition for

imaginative play than play as an antecedent for cognitive development.

This conclusion applies more for specific than for general imaginative play behaviors. That is, the change score patterns for dramatic play and cognitive ability were less pronounced than those for sociodramatic play and cognitive ability and general transformational behavior and cognitive ability, and each of these patterns was less pronounced than the patterns involving cognitive ability scores and play measures for enacting fantasy as opposed to imitative play themes and for transforming situations without props. These findings agree with Smilansky (1968) who noted that of her six criteria for defining sociodramatic play, situational transformations is the most difficult characteristic, and with Saltz, Dixon & Johnson (1977) who found that thematic-fantasy play was more difficult for disadvantaged preschool-aged children than was socio-dramatic play. From our data it would appear that preschool children need to have obtained a certain level of cognitive ability before displaying more difficult pretend play acts, but not dramatic play in general. This conclusion is compatible with Singer (1973) who takes the position that above a certain minimum level of cognitive ability imaginative play is possible, and beyond which variation in imaginative play is attributable to personality differences--that fantasy-making predisposition and general intelligence are unrelated. The present study adds the point that the threshold of prerequiste cognitive ability needs to be raised for the emergence of more sophisticated pretend behaviors during the preschool years.

Although our results so far are not supportive of a causal relationship between imaginative play and cognitive abilities, the findings are incomplete. Only logical concepts, receptive vocabulary (PPVT) and nonverbal intelligence

(Raven) were assessed. While social cognition and divergent thought may be seen as subsets of more general cognitive ability, there is sufficient disagreement over this to warrant independent evaluation of their relationship to imaginative play over time. Second, samples of preschoolers varying in levels of cognitive maturity deserve studying. Perhaps at certain levels of cognitive ability dramatic play experience can be shown to be constitutive of development but not at other levels of cognitve maturity.

The finding are incomplete in another way. We are presently adding a third and fourth wave of measurement. Further examination of the play and the cognitive test score changes could reveal patterns in our data leading to new conclusions. For example, we are eager to see if the children not increasing in imaginative play but displaying increases in cognitive ability in this study reveal increments in imaginative play during the third year of measurement. It should be noted that in the present treatment of the data we used direction of change scores. A methological improvement in scoring will be to devise criteria for success and failure in achieving cognitive mastery and play mastery. With this improvement stronger statements about suggested direction of influence between play and cognition could be made.

What value has play? Dramatic play, although perhaps not generative of cognitive development initially, may indirectly affect cognitive development by helping the child cement previous cognitive advancements. Major developmental theorists have said that adaptive intelligence involves <u>both</u> differentiation <u>and</u> integration (Werner), accommodation <u>and</u> assimilation (Piaget). Integrating and consolidating recent learning and conceptual advancements is as vital to cognitive development as the initial acquisition itself.

The "rest stop" of play transforms into a "launching pad" for further cognitive development. Secondly, what is developmentally or educationally relevant may include factors having motivational value. Imaginative play can be influential in child development and education through the support it provides for the child's emerging self concept and esteem. For example, its possible role in the development of coping mechanisms is suggested by research relating imaginative play with impulse control and waiting ability (Saltz et. al. 1977; Singer, 1961). In other words, imaginative play may impact cognitive development through its effect on the child's motivational system or by its serving ego-maintainence or ego-continuity functions. To divide too sharply constitutive from expressive functions may lead one to underestimate the value of play in development. Such polarization also is inconsistent with a holistic view that adaptation and development entail both functions as inseparable complementary processes.

Finally, the present study does not rule out that functional or constructive or other forms of play may contribute to cognitive development in a generative sense. Given that imaginative play may be viewed as the highest level of play during the preschool years, it perhaps may not seem too surprising that we have suggested cognitive prerequistes, particularly for forms of pretending entailing rather sophisticated symbolic capabilities. It would seem worthwhile, then, to rexamine carefully lower-level or "presymbolic" play behaviors for their possible contribution toward the development of symbolic capabilities in young children. Results of such research could prove encouraging and enlightening to play interventionists who are not yet ready to abandon belief in an affirmative answer to the basic question raised by the title of this symposium.

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Footnotes

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Table 1

Change in Cognitive Ability and Imaginative Play
From Year One to Year Two (N=24)

PLAY MEASURES

Cognitive Measures		DRAMATIC		TRANSFORMATIONS		SOCIODRAMATIC		THEMATIC-FANTASY		SITUATIONAL TRANSFORMATION	
		+	0	+	0	+	0	+	0	+	0
PPVT IQ	+	7	6	11	2	8	5	2	11	5	8
	0	5	6	5	6	3	8	6	5	3	8
RAVEN IQ	+	5	6	8	3	3	8	5	6	5	6
	0	7	6	8	5	8	5	3	10	3	10
CONSERVATION ABILITY	+	7	10	11	6	8	9	6	11	6	11
	0	5	2	5	2	3	4	2	5	2	5
CLASSIFICATION ABILITY	+	5	7	8	4	6	6	6	6	3	9
	0	7	5	8	4	5	7	2	10	5	7

Note. Figures refer to number of children showing change pattern.